

## Ground Movements for 20 Leighton Road, Camden, London

Taking height of adjacent house as  $H=9\text{m}$  and width of no settlement as  $L=8\text{m}$

Then  $L/H=0.88$

Depth of basement excavation to No 20 take as  $1.80\text{m}$ . Depth of walls  $2.20\text{m}$ .

### Horizontal movement due to installation of wall

$$0.05\% \times 2200\text{mm} = 1.10\text{mm}$$

$$\text{Distance to negligible movement } 1.5 \times 2200\text{mm} = 3300\text{mm}$$

### Horizontal movement due to excavation

$$0.15\% \times 1800\text{mm} = 2.70\text{mm}$$

$$\text{Distance to negligible movement } 4 \times 1800\text{mm} = 7200\text{mm}$$

$$\text{Maximum horizontal movement is } 3.80\text{mm} \quad (1.10+2.70\text{mm})$$

$$\text{Horizontal strain over } 8.0\text{m} \text{ is } 3.80\text{mm} / 8000\text{mm} \times 100 = 0.0475\%$$

### Vertical movement due to installation of wall

$$0.05\% \times 2200\text{mm} = 1.10\text{mm}$$

$$\text{Distance to negligible movement } 1.5 \times 2200\text{mm} = 3300\text{mm}$$

### Vertical movement due to excavation

$$(0.10\% \times 1800\text{mm} = 1.80\text{mm} \text{ from Table 2.4})$$

Instead use Fig 2.11(b) which is more accurate and shows 0.05% at the wall, 0.1% is never reached by the curve or the measured ground movements, so 0.05% is conservative.

$$0.05\% \times 1800\text{mm} = 0.90\text{mm}$$

$$\text{Distance to negligible movement } 3.5 \times 1800 = 6300\text{mm}$$

$$\text{Maximum vertical movement is } 1.19\text{mm} \quad (0.09 + 1.10\text{mm})$$

House slope calculated as  $(\text{max vert settl} - (\text{max vert settle}/8\text{m})) \times x$ , where  $x$ =distance from wall.

By plotting house slope for full 8.0m distance of strain the maximum deflection or depth (total vert settlement minus house slope) calculated, is 0.70mm at 4m distance from the house. Therefore take 0.70mm for deflection to be conservative.

$$\text{Deflection/length} = 0.70/8/1000 \times 100 = 0.00875$$

Category 1

Deflection/length/Elim for Category 1 =  $0.00875 / 0.075 = 0.117$

Horizontal strain/Elim for Category 1 =  $0.0475 / 0.075 = 0.633$

The above plotted on CIRIA 580 Fig 2.18b fall below the  $L/H = 0.88$  (as required).

Therefore, anticipated Damage Category according to C580 Table 2.5 is very slight.

Category 0

Deflection/length/Elim for Category 0 =  $0.00875 / 0.05 = 0.175$

Horizontal strain/Elim for Category 0 =  $0.0475 / 0.05 = 0.95$

The above plotted on CIRIA 580 Fig 2.18b falls above the  $L/H = 0.88$ .

Therefore, anticipated Damage Category according to C580 Table 2.5 is not negligible.

